Patent claims

1. A steam turbine rotor (21, 30, 75) which extends along an axial extent (25, 34) and has:

- an outer side (26a), which adjoins an outer space (27a, 35) which is intended to receive a main flow (27, 36) of a fluid working medium (8),
- a first location (30a) along the outer side (26a, 33), at which a first blade (41a) is held,

characterized by

- at least one integrated passage (44, 46a, 46b, 93, 96, 103, 106), which extends continuously at least between a first region (28a, 72) arranged in front of the first location (30a) and a second region (28b, 73) arranged behind the first location (30a).

2. The steam turbine rotor as claimed in claim 1, characterized by a second location (30b) along the outer side (26a), at which a second blade (41b) is held, the second location (30b) being arranged behind the first location (30a) along the axial extent (25, 34), and the passage (44, 46a, 46b, 93, 96, 103, 106) extending continuously at least between a first region (28a, 72) arranged in front of the first location (30a) and a second region (28b, 73) arranged behind the second location (30b).

3. The steam turbine rotor as claimed in claim 2, characterized in that a number of further locations, at each of which a blade (41a, 41b) is held, are arranged between the first location (30a) and the second location (30b).

4. The steam turbine rotor as claimed in one of claims 1 to 3, characterized in that the at least one passage (44, 46a, 46b, 93, 96, 103, 106) is part of a

combined passage system (43) which extends along the axial extent (25, 34).

5. The steam turbine rotor as claimed in one of claims 1 to 4, characterized in that the at least one passage (44, 46a, 46b, 93, 96, 103, 106) is part of a combined passage system (43) which has an external feed (70) which is provided for the incoming flow of cooling medium (10, 71).

6. The steam turbine rotor as claimed in one of claims 1 to 5, characterized in that the at least one passage (44, 46a, 46b, 93, 96, 103, 106) is part of a combined passage system (43) which includes a channel (45) which at least partially encircles a circumferential extent of the rotor (21, 30, 75).

7. The steam turbine rotor as claimed in one of claims 1 to 6, characterized in that the first region (28a) has a first opening (49, 99, 109) to the main flow (27, 36).

8. The steam turbine rotor as claimed in one of claims 1 to 7, characterized in that the second region (28b) has a second opening (47, 99, 109) to the main flow (27, 36).

9. The steam turbine rotor as claimed in one of claims 1 to 8, characterized in that the outer side (26a) of the rotor (21, 30, 75) is formed by a shielding plate (38) which can rotate with the rotor (21, 30, 75).

10. The steam turbine rotor as claimed in one of claims 1 to 9, characterized in that a shielding plate (38) which can rotate with the rotor (21, 30, 75) is held by a blade (41a, 41b), in particular a blade root (39a, 39b).

11. The steam turbine rotor as claimed in claim 9 or 10, characterized in that a shield for the rotor shaft with respect to the main flow of the steam is at least partially formed by a blade root (39a, 39b).

12. The steam turbine rotor as claimed in one of claims 1 to 11, characterized in that the passage (46a, 46b, 96, 106) leads through a blade (41a, 41b), in particular through a blade root (39a, 39b).

13. The steam turbine rotor as claimed in one of claims 1 to 12, characterized by a groove (40a, 40b) at a blade root (39a, 39b), which groove is part of the passage (44).

14. The steam turbine rotor as claimed in one of claims 1 to 13, characterized by a bore (46a, 46a') through a single blade root (39a, 39a') and/or a bore (46a") through two adjacent blade roots (39a"), which bore is part of the passage (44).

15. The steam turbine rotor as claimed in one of claims 1 to 14, characterized by a channel (106, 110) in a main blade part (108), which channel is connected to the passage (44).

16. The steam turbine rotor as claimed in one of claims 1 to 15, characterized in that a thermally insulating coating made from a material which has a lower heat conduction coefficient than the base material of the blade is provided on a blade surface.

17. A steam turbine (77, 20), which includes the steam turbine rotor (21, 30, 75) as claimed in one of claims 1 to 16.

18. A method for actively cooling a steam turbine rotor (21, 30, 75) which extends along an axial extent (25, 34) and has

- an outer side (26a), which adjoins an outer space (27a, 35) which is intended to receive a main flow (27, 36) of a fluid working medium (8),
- a first location (30a) along the outer side (26a, 33), at which a first blade (41a) is held,

characterized in that

- a fluid cooling medium (10, 71) is guided continuously within the steam turbine rotor (21, 30, 75) along the axial extent (25), at least between a first region (28a, 72) arranged in front of the first location (30a) and a second region (28b, 73) arranged behind the first location (30a).

19. The method for actively cooling a steam turbine rotor as claimed in claim 18, characterized in that the steam turbine rotor (21, 30, 75) has a second location (30b) along the outer side (26a, 33), at which a second blade (41b) is held, the second location (30b) being arranged behind the first location (30a) along the axial extent (25, 34), and the fluid cooling medium (10, 71) being guided continuously at least between a first region (28a, 72) arranged in front of the first location (30a) and a second region (28b, 73) arranged behind the second location (30b).

20. The method for actively cooling a steam turbine rotor as claimed in claim 19, characterized in that the cooling medium (10, 71) is guided in a combined passage system (43) along the axial extent (25, 34) over the first location (30a) and the second location (30b) and a number of intervening further locations (24), at each of which a blade (41a, 41b) is held.

21. The method for actively cooling a steam turbine rotor as claimed in one of claims 18 to 20, characterized in that the cooling medium (10, 71) is fed to the steam turbine rotor (21, 30, 75) from the outside (70).

22. The method for actively cooling a steam turbine rotor as claimed in one of claims 18 to 21, characterized in that the cooling medium is guided at a pressure which exceeds a pressure of the main flow (27, 36).

23. The method for actively cooling a steam turbine rotor as claimed in one of claims 18 to 22, characterized in that the cooling medium (10, 71) is guided at a pressure which is modified (47, 48, 49, 99, 109) in particular throttled, as a function of a pressure of the main flow (27, 36).

24. The method for actively cooling a steam turbine rotor as claimed in one of claims 18 to 23, characterized in that the cooling medium (10, 71) is supplied at a temperature and/or in an amount which is/are modified (47, 48, 49, 99, 109) as a function of a temperature of the main flow (27, 36).

25. The use of active cooling of a steam turbine rotor (21, 30, 75) for starting up and/or running down a steam turbine (77, 20), in particular for rapid cooling of a steam turbine (77, 20).